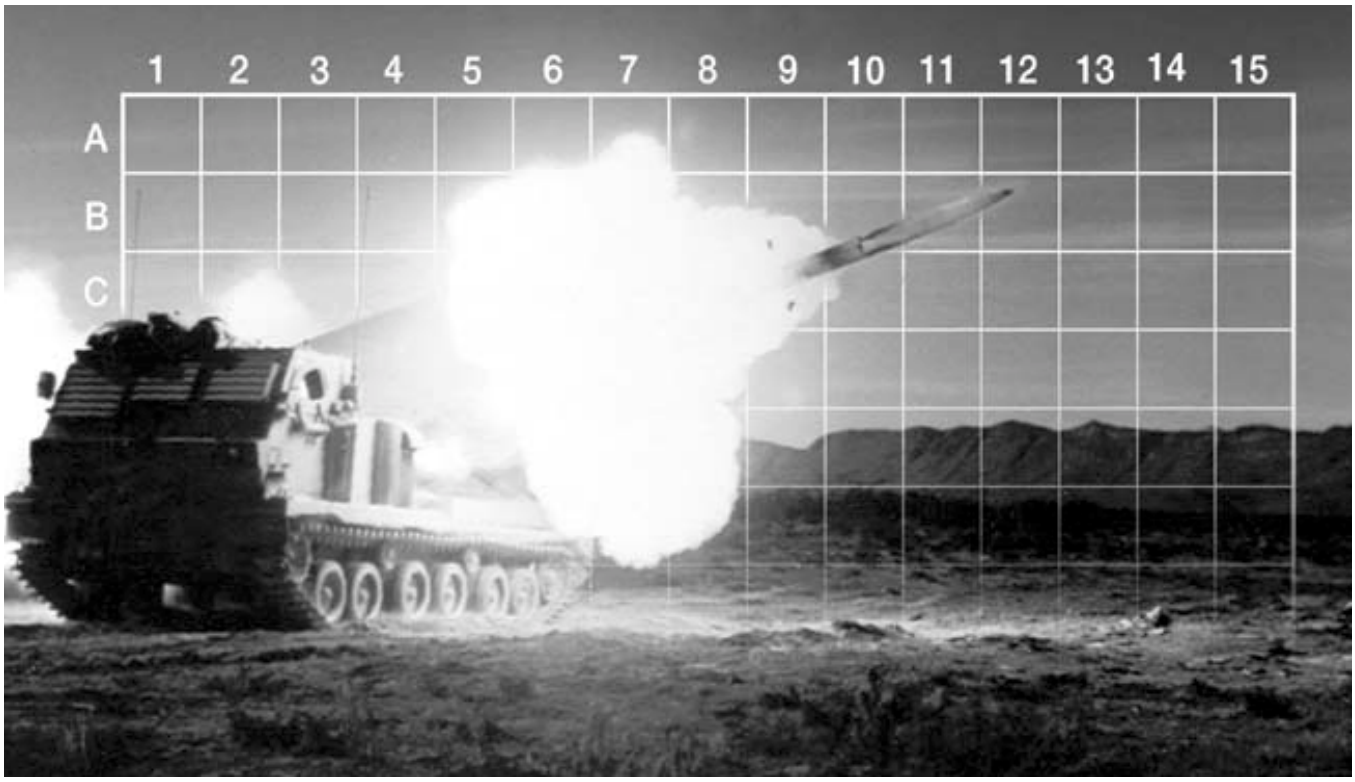

JTRGS:

Common Reference System for Coordinating and Synchronizing Joint Fires

By Major Adam J. Legg

Recently, the V Corps Fires and Effects Coordination Cell (FECC) staff, Schwetzingen, Germany, helped develop the US Army Europe/US Air Force Europe (USAREUR/USAFE) joint tactics, techniques and procedures (JTTP) for command and control of joint fires. From this effort grew the Joint Target Reference Grid System (JTRGS). JTRGS was tested initially in Urgent Victory, a corps Battle Command Training Program (BCTP) Warfighter exercise, and refined later by the USAREUR and USAFE staffs.

The JTTP currently consist of 10 TTP areas, but this article focuses on JTRGS to coordinate and synchronize the corps resources and its supporting joint fires assets.

Common Reference System. The common reference system or "Kill Box," as it is sometimes called, is simply a grid overlay established by the joint force commander (JFC) or his representative. It normally is based on a grid work of lines superimposed on map latitude and longitude lines covering the entire joint area of operations (AOR).

To command and control joint fires, the grid system must be developed in coordination with higher, lower and adjacent as well as supporting command headquarters. Its size must take into account the capabilities and coordination requirements of all joint weapons that will use the reference system. The joint force must understand and be able to display the common reference system, at a minimum as acetate overlays for battle tracking maps. Preferably, the Army battle command systems (ABCS) and other components' automated systems (i.e., the Air Force's automated theater battle management core system, or TBMCS) would be able to manage the reference system.

Joint Publication (JP) 3-60 Joint Doctrine for Targeting (Final Coordination Draft, 5 April 2001) as well as *FM 90-36 (FM 3-60.1) Targeting*: *The Joint Targeting Process and Procedures for Targeting Time-Critical Targets* (July 1997) state the purpose of a reference system is to provide a common frame of reference and common situational awareness to facilitate joint attack coordination, deconfliction and synchronization. This is important because different components refer to target locations and areas by different means as well as graphics.

For example, the Air Force uses latitude and longitude in geographic reference, and the Army uses the military grid reference system. In addition, these two components most certainly will use a different set of control measures when referring to vertical and horizontal battlespace.

The bottom line is that a joint reference system allows multiple components to "see" the battlespace from a common frame of reference and quickly orient and direct the effects of their combined forces within it.

During our development of JTRGS, we found the term "kill box" was confusing. Kill box implies the systems using it only attack whatever is in the grid box. For example, an Army or Marine unit could use the common reference system to designate named areas of interests (NAIs) during the intelligence preparation of the battlefield (IPB). In this case, designating "kill box" 7A as an NAI to observe could cause other components to think the forces in the box are to be attacked instead of just observed.

The JTRGS Reference System. The JTRGS grid boxes cover the joint AOR. (See Figure 1.) Each grid box is 30-by-30 minutes in latitude and longitude, but the size may be modified by the JFC when necessary. The JTRGS may be used to establish any type of airspace control measures (ACM), fire support coordination measures (FSCM) and (or) to designate a kill box.

JTRGS allows component battle management staffs maximum flexibility to coordinate user requirements for joint operations during planning and for synchronizing execution in real time. For example, the following Army messages would be clear to all components: "Destroy MRL [multiple rocket launcher] targets in the following JTRGS boxes: in priority, 7K1, 7M1 and 7N1." Another example: "Disrupt the 9th Tank Regiment as it moves through 8K1, 8K2 or 8K5."

The JTRGS grids can be communicated over nonsecure channels (voice or data) without risk of compromise as long as the origin's coordinates are not associated with them. The initial reference coordinates are published in classified orders and instructions. The JTRGS is disseminated to each component and its command and control and attack assets as a portion of the airspace control order (ACO) or in the special instructions (SPINS) portions of the air tasking order (ATO).

Employing JTRGS. The following are examples of key procedures where the JTRGS enhanced V Corps' ability to rapidly synchronize and coordinate joint fires and effects: describing the priorities, effects and timing of air support; establishing FSCM and ACM; rapidly establishing NAIs or target areas of interest (TAIs) to focus intelligence collection; pre-clearing areas for procedural control of close air support (CAS) without endangering friendly forces; facilitating the targeting of moving enemy forces; and rapidly deconflicting

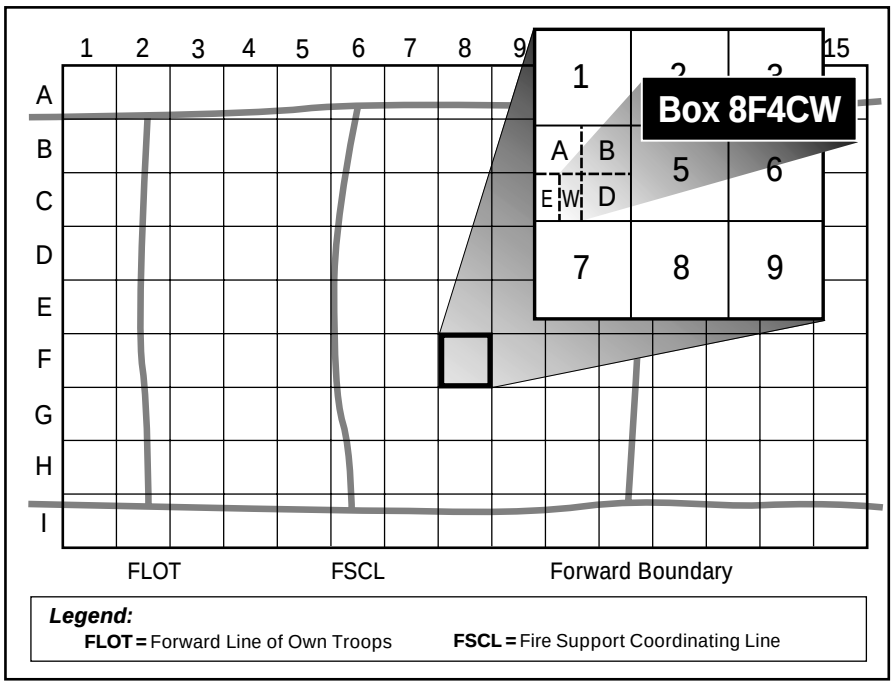

Figure 1: Joint Target Reference Grid System (JTRGS). The JTRGS grid boxes cover the joint area of responsibility. Each grid box is 30-by-30 minutes in latitude and longitude and identified by a number (west/east) and letter (north/south). Each box is divided into nine sectors, measuring 10 minutes by 10 minutes. Each sector is further divided into four subsectors, five minutes by five minutes, that are labeled "A," "B," "C" and "D." Each sub-sector then can be divided in half vertically, forming east (E) and west (W) halves.

airspace for the Army tactical missile system (ATACMS).

FSCM and ACM Coordination. You are a member of a hastily assembled targeting team to take advantage of the unanticipated detection of a second-echelon enemy mechanized regiment delayed by a minefield in JTRGS Box 4C. (See Figure 2.) The original plan called for the regiment to be attacked near JTRGS Box 4B.

Using JTRGS, the team planners could rapidly re-target the enemy formation for a cross-forward line of own troops (FLOT) attack by the original AH-64 squadron, assuming the squadron's

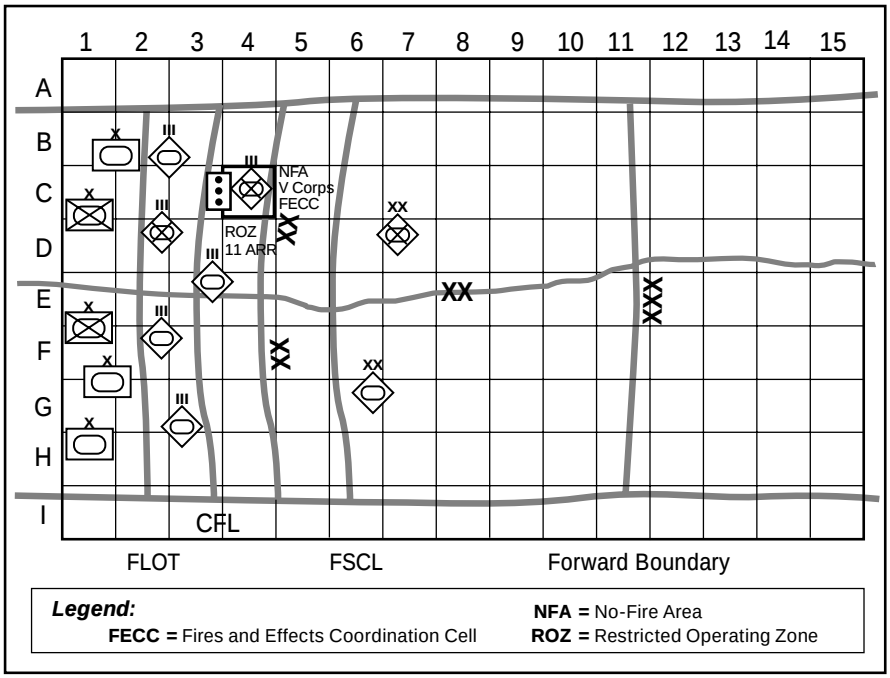

Figure 2: Fire Support Coordination Measures (FSCM) and Air Control Measures (ACM)

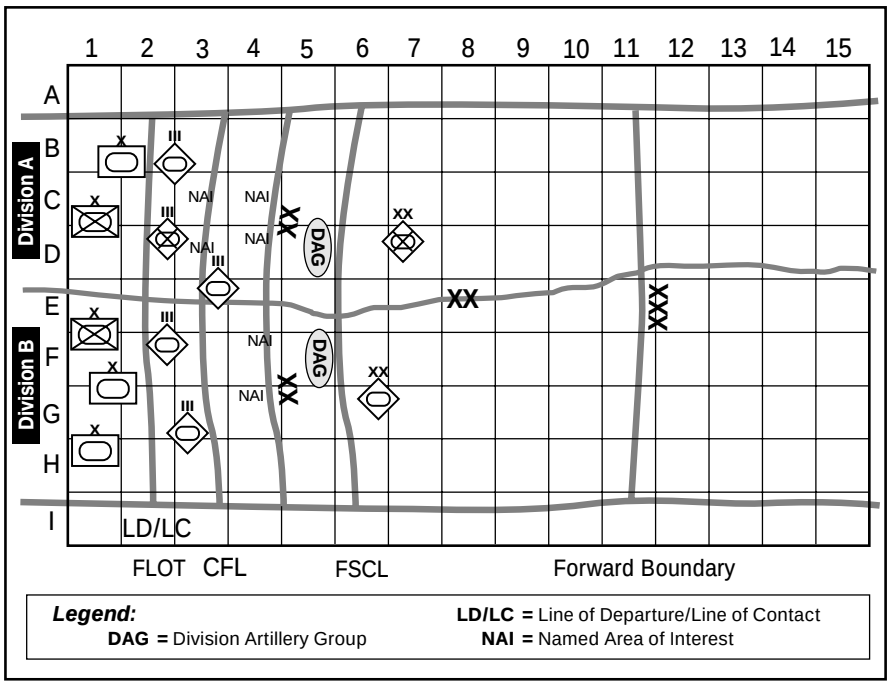

Figure 3: Air Support Requirements for Designating NAIs and Focusing Unmanned Aerial Vehicles (UAVs)

planned ingress and egress routes only needed minor modification. In this case, the team could rapidly designate Box 4C as a no-fire area (NFA) to prohibit the divisions from firing into the squadron's engagement area (EA) and attack-by-fire positions.

Additionally, the air component's air operations center (AOC) could establish Box 4C as a restricted operating zone (ROZ) to prohibit CAS or air interdiction (AI) aircraft from operating within the EA.

All this coordination could take place in real time with the air and ground components, including subordinate divisions and the attack helicopter regiment in the absence of any planned graphic control measures (FSCM and ACM).

Air Support Requirements for NAIs and Collection Efforts. In continuing the planning, Division A identifies that it needs the weight of its future CAS sorties available from the time the division crosses the line of departure (LD) at 0600Z and for four hours after. (See Figure 3.) Division A established its target priority for CAS as the enemy's division artillery groups (DAGs) located near Boxes 3C, 3D, 4C and 4D. The DAGs consisted of 2S3 and BM-21 artillery systems. These grid boxes were the same boxes designated as NAIs and TAIs during the IPB and targeting process.

The planners determined they needed to destroy enemy air defense systems that could affect the CAS aircraft in the boxes. With the grid boxes identified, the collection manager can build the collection plan to support the operation.

Division A's air support request (ASR) for CAS to refine the corps CAS focus and massing plan would read something like the information in Figure 4.

Using this method of describing the division's air support targeting priorities, attack timings and desired effects in relation to the JTRGS allows the air component planners to more easily understand the division's requirements, visualize where they will provide the required effects and understand how and where the division will enable the operation with suppression of enemy air defenses (SEAD).

Activating Kill Boxes. To continue the previous example, before Division A crosses the LD, the DAGs reposition to gain the advantage. While executing the collection plan, the corps unmanned aerial vehicles (UAVs) detect both artillery groups predominantly in Boxes 4D and 4F. Knowing we had established a permissive air defense environment based on the success of our air defense targeting plan and ability to provide lethal SEAD if required, the corps FECC could designate both 4D and 4F as kill boxes for air support to kill the DAGs.

Because each of the boxes can be defined vertically as well as horizontally in battlespace, planners can easily use the same boxes to define the altitude separation requirements for informal ACAs in the JTRGS boxes, now also designated as kill boxes. This allows the corps to rapidly flow pre-planned massed CAS aircraft into the boxes to destroy the artillery formations, preventing air fratricide as well as facilitating the artillery's ability to fire SEAD under the separation altitude, if required.

We defined the kill box to mean that CAS aircraft in an active or open kill box could operate under procedural control. In managing this process, we found it useful to develop a checklist for activating or opening kill boxes. An example checklist is shown in Figure 5.

Deconflicting ATACMS Airspace. JTRGS can help rapidly deconflict air-

Justification: CAS [close air support] is required to destroy the 23d DAG [division artillery group] vicinity JTRGS 3C, 3D, 4C and 4D to prevent massed fires on the division and allow rapid penetration of first-echelon regiments.

Desired results: Destroy 30 2S3s and 14 BM-21s between LD [line of departure] (0600Z) and plus 4 hours. Expect the DAG to be located NLT LD plus 1 hour. Upon location, the division will establish a kill box with an informal ACA [airspace coordination area] for altitude separation to prevent air fratricide and allow CAS aircraft to operate under procedural control. The ability to mass air support assets on artillery targets during this time is critical to the success of the division's operations and if not provided, could cause the division to lose momentum moving through first-echelon regiments. CAS requirements following this time are minimal and expected to require no more than two sorties per hour to support lead TFs [task forces] between JTRGS 4B, C and D and 5B, C and D.

Comments: The division will conduct opportune SEAD [suppression of enemy air defenses] to destroy acquired air defense systems in JTRGS 3C, 3D, 4C and 4D to help provide a permissive air defense environment NLT the division crossing LD.

Figure 4: Division A's ASR for CAS. This request is based on the scenario in Figure 3 and refines the corps' focus.

- Applicable ground commander initiates a request through the G3/S3 air in the fire support element (FSE) or deep operations coordination cell (DOCC).
- The FSE and Army airspace coordination center (A^2C^2) initiate air control measure (ACMs) and fire support coordination measures (FSCM) for the kill box.
- The G3/S3 air confirms the kill box is clear of friendly troops.
- The S3 passes the request to the division FSE/DOCC for concurrence.
- The division G3 air approves the kill box before passing it forward to the corps A^2C^2.
- The division A^2C^2 enters the request into the automated deep operations coordination system (ADOCS) and forwards it to the G3 air via the A^2C^2 in the corps fires and effects coordination cell (FECC).
- The corps A^2C^2 coordinates with the air support operations center (ASOC) and the corps G3 air before activating the kill box and notifying the battlefield coordination detachment (BCD).
- The corps A^2C^2 notifies the affected division A^2C^2 of the kill box's open status and sends a broadcast message confirming its activation through ADOCS.
- A kill box is not considered open without coordination with the ASOC and corps G3 air in the FECC.
- Reasonable assurance and procedural control is in effect for tactical air (TACAIR) aircraft expending ordnance in an active kill box.

Figure 5: Procedures for Establishing JTRGS Kill Boxes Short of the Fire Support Coordinating Line (FSCL)

space for ATACMS missions. Such missions call for the airspace deconfliction of the ATACMS platoon launch site, missile flight path and target area. The JTRGS allows for using a sector, a smaller subdivision of the 30-by-30 minute grid boxes. (See Figure 6.) We have found it easier to designate a battalion-sized area of one sector (10-by-10 minutes) for the hot firing unit and pre-plan this platoon area hazard (PAH) ROZ with the BCD. After the target is detected, we designate the smaller division of the sector, the five-by-five minute sub-sector, as the target area hazard's (TAH) ROZ because most TAH ROZs fall within that size. Designating the area hazards as a ROZ in relation to the JTRGS allows us to define a vertical volume of airspace. Because most aircraft easily can modify their flight to avoid vertical restrictions, this provides a means to minimize the potential for air fratricide.

Although the advanced FA tactical data system (AFATDS) can compute the exact size of the TAH and PAH ROZs and transmit this information to the BCD for clearance, we found manual deconfliction using JTRGS to be faster. Perhaps, in the future, if AFATDS communicates this information to the TBMCS, it will be more beneficial to process the deconfliction in AFATDS.

Lack of Automation Support. ABCS automated support of common reference system currently does not exist. Automated deep operations coordination software (ADOCS) allows all corps ADOCS users as well as those in the BCD to visualize which kill boxes are active or open. (The software horizontally integrates information from other systems into one fused common operating picture for deep operations.) Additionally, the system tracks cursor movement by JTRGS grid box and automatically produces an overlay of the common reference system for JTRGS, the US Central Command (CENTCOM) Kill Box Reference System, and the Korean Grid System. No current systems can designate or directly link ACMs, FSCM or other control mea-

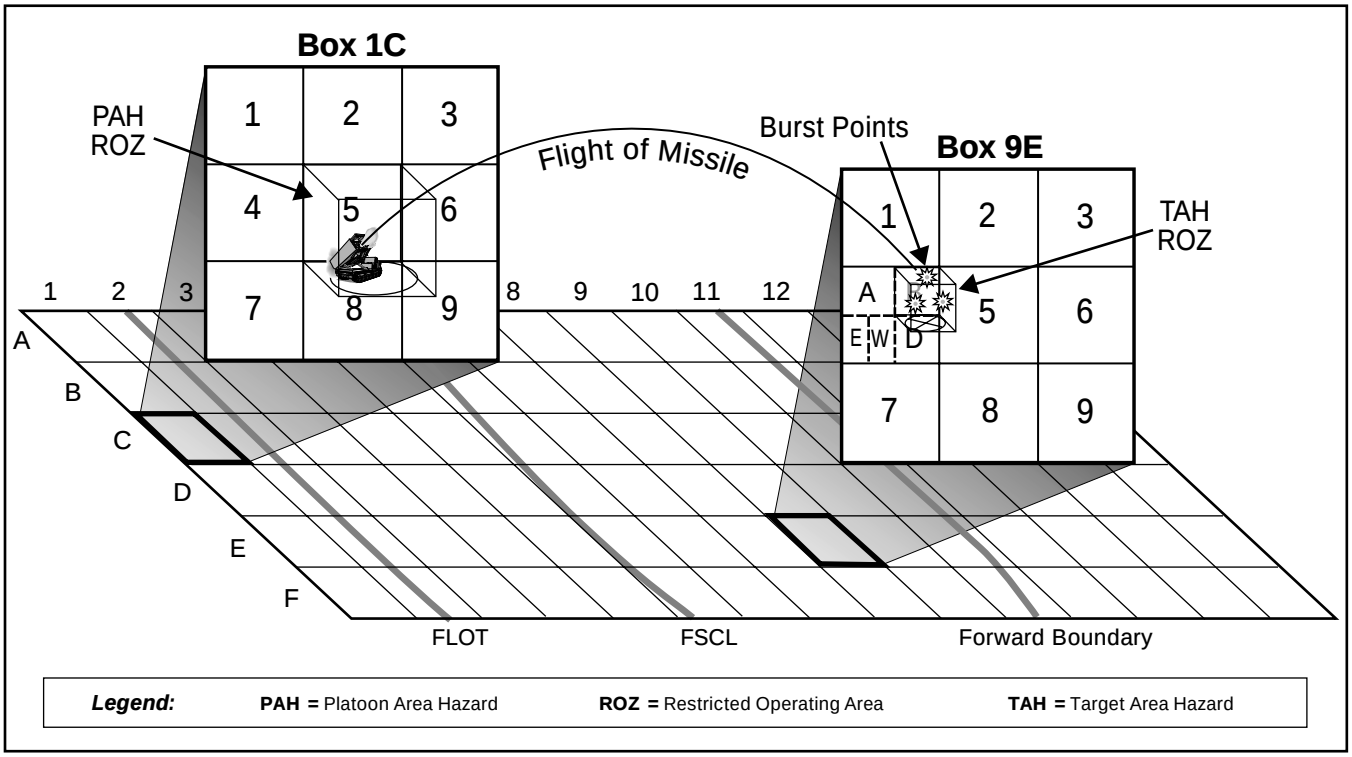

Figure 6: Army Tactical Missile System (ATACMS) Airspace Deconfliction

sures to the common reference system. ABCS systems only allow the operator to manually build an overlay to reference the common reference system.

If we are truly to realize the benefits of the joint common reference system, then ABCS systems will have to acquire tools similar to those provided by ADOCS. Otherwise, the joint force will be restricted to overlays with no ability to automatically update changes across all systems in real time and no ability to quickly link to other functionalities to establish ACMs and FSCMs.

JTRGS Challenges. Unfortunately, the application of the common reference system is different theater by theater, making it hard to define one reference system in joint doctrine. The USAREUR/USAFE JTRGS is different than CENTCOM's kill box reference system and both are different than the Korean theater's system. All these systems are based on joint doctrine found in JP 3-60 (Draft) and the Air Land Sea Application (ALSA) Center's "Multi-service TTP for Targeting." The doctrine allows these differences by stating that the JFC and component commanders each have a role in establishing their systems.

Of the two doctrinal publications, only the ALSA publication is approved doctrine, and it defines the system as the "Grid Box" reference system. Upon approval, JP-3-60 will rename the grid box as the kill box reference system—which we found could be misleading and confusing. For joint doctrine to be effective, it must be designed from all components' perspectives and the components must uniformly understand and accept it.

Major Adam J. (A.J.) Legg until recently was the Deep Fires Coordinator in the Fires and Effects Coordination Cell (FECC) assigned to V Corps Artillery Fire Support Element (FSE) in Germany. Currently, he is the S3 of the 1st Battalion, 27th Field Artillery, 41st Field Artillery Brigade, also in V Corps. He also served as the Targeting Officer in the V Corps Deep Operations Coordination Cell (DOCC) and as Aide-de-Camp to the Commanding General of V Corps Artillery. He commanded a detachment at the Warrior Preparation Center in Germany; and C Battery, 3d Battalion, 321st Field Artillery and Headquarters and Headquarters Battery, 3d Battalion, 8th Field Artillery, both part of the 18th Field Artillery Brigade at Fort Bragg, North Carolina. Major Legg is a graduate of the Command and General Staff College at Fort Leavenworth, Kansas, and holds a Master of Science in Computer Resources and Information Management from Webster University, St. Louis, Missouri.

The author wishes to acknowledge US Army Europe's (USAREUR's) 4th Battlefield Coordination Detachment (BCD) as well as US Air Force Europe's (USAFE's) 32d Air Operations Group and the 4th Air Support Operations Group for invaluable assistance in developing the Joint Target Reference Grid System (JTRGS) and USAREUR/USAFE joint tactics, techniques and procedures for command and control of joint fires.

NTC's First Senior Radar and Targeting NCO

The National Training Center (NTC), Fort Irwin, California, has added a new member to the Fire Support Combat Trainers. In November, Sergeant First Class Robby K. Steadham, Military Occupational Specialist (MOS) 13R40 Firefinder Radar Operator, became the first Senior Radar and Targeting NCO to join the Were Wolves. Since that time, he has been an active coach, mentor and trainer for rotational leaders and soldiers at the NTC.

This new era at the NTC is greatly benefiting the NCOs and soldiers in radar sections who are employing their systems in the country of Mojavia. SFC Steadham's extensive knowledge and background in targeting will help those NCOs transition into their new roles as targeting NCOs at the brigade, division and corps levels.

SFC Steadham is focusing his coaching efforts on radar employment, troop-leading procedures, risk management, pre-combat checks and inspections, employment of security and survivability assets, radar site selection, radar shelter operations, battle tracking and radar zone management. His priority is to ensure radar NCOs become fully integrated into the military decision-making process (MDMP).

If you have questions, contact Chief Warrant Officer Two Timothy D. Lancaster, Combat Radar/Targeting Trainer, or SFC Steadham of the Were Wolf Team at DSN: 470-6962 or by email at Wolf36@irwin.army.mil and Wolf36A@irwin.army.mil, respectively.

LTC Glenn D. Reisweber
Reinforcing TOC Trainer,
NTC, Fort Irwin, CA

Joint Targeting Conference at Fort Sill

The Target Acquisition Division of the Fire Support and Combined Arms Operations Department (FSCAOD), Field Artillery School, Fort Sill, Oklahoma, is hosting a Joint Targeting Conference 1-5 October. The purpose of the conference is to provide information on targeting, TA, new equipment, and current operations and issues as well as exchange tactics, techniques and procedures (TTP). The topics discussed will range from the tactical to strategic levels.

Representatives of several installations and other military services will attend. Everyone who works with or is interested in targeting/TA subjects is invited to attend. All Military Occupational Specialty (MOS) 131A Targeting Technicians are encouraged to attend.

If you would like to present a briefing at the conference, suggest a specific topic to discuss or register for the conference, contact me at DSN 639-5045/4925/2971 or commercial (580) 442-5045/4925. My email is saindonc@sill.army.mil.

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